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Central Intelligence Agency

Washington, D.C. 20505

DIRECTORATE OF INTELLIGENCE

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28 MAR 1983

MEMORANDUM FOR: Dr. Norman A. Bailey
Senior Director, National
Security Planning
National Security Council

FROM : [REDACTED]
Deputy Director for Economic-Resource
Analysis
Office of Global Issues

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SUBJECT : Japanese Energy Security [REDACTED]

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1. In light of your interest in Japan's energy outlook, I am forwarding an advance copy of a forthcoming intelligence assessment on Japanese energy security. [REDACTED]

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2. If you have any questions or if we can be of further assistance, please feel free to contact [REDACTED]

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Attachment:

Japanese Energy Security: Prospects and Implications
GI M 83-10083, March 1983 [REDACTED]

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Washington, D.C. 20505

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28 MAR 1983

MEMORANDUM FOR: E. Allan Wendt
Deputy Assistant Secretary for
International Energy Policy
Department of State

FROM : [REDACTED] 25X1
Deputy Director for Economic-Resource
Analysis
Office of Global Issues

SUBJECT : Japanese Energy Security [REDACTED] 25X1

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Japanese Energy Security: Prospects and Implications
GI M 83-10083, March 1983 [REDACTED] 25X1

Central Intelligence Agency




Washington, D.C. 20505


DIRECTORATE OF INTELLIGENCE

26 MAR 1983


MEMORANDUM FOR: Ambassador Richard Fairbanks
Office of the Special Middle
East Peace Negotiator
Department of State

FROM : 
Deputy Director for Economic-Resource
Analysis
Office of Global Issues

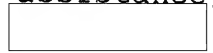
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Japanese Energy Security: Prospects and Implications
GI M 83-10083, March 1983 

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SUBJECT: Japanese Energy Security: Prospects and Implications

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DIRECTORATE OF INTELLIGENCE

24 March 1983

Japanese Energy Security: Prospects and ImplicationsSummary

Japan will remain extremely vulnerable to oil supply disruptions over the next two decades. Imported oil will account for about half Japan's energy needs through the year 2000 and the bulk of Japan's oil supplies probably will continue to come from politically unstable Persian Gulf sources. At the same time, Japan will continue to rely heavily on imports for coal and natural gas supplies because domestic production of all hydrocarbons is extremely limited. [redacted]

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Although lowered prospects for economic growth have reduced sharply Japanese energy needs over the next two decades, slow development of non-oil energy sources will leave Japan heavily dependent upon imported oil. Recent Japanese private-sector forecasts place the use of natural gas, coal, nuclear power and new energies at only 3.8 million b/doe in 1990--1.7 million b/doe below official government projections. Several factors will limit the growth of oil alternatives:

- o Increased use of liquefied natural gas (LNG) will be impeded by its high price relative to fuel oil and the inflexibility of "take or pay" clauses in producer contracts.
- o Coal use will be constrained by environmental regulations, high capital costs, limited space for coal storage and preparation facilities, and ash disposal problems.
- o Nuclear power will require huge capital outlays and face public opposition and siting difficulties.
- o New energy sources, such as coal synfuels, will be hindered by technological developments and cost factors.
- o Funds for developing all non-oil energy sources will likely be limited by government efforts to balance the budget. [redacted]

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Taking these factors into account, we believe there is little potential for Japan to significantly expand use of non-oil energy sources beyond estimated levels. As a result, Japan will need to concentrate greater efforts towards minimizing the country's vulnerability to a cutoff in Middle East oil supplies including:

- o Stepped-up efforts to diversify oil supplies away from Persian Gulf sources.
- o Boosting government-owned oil stocks.
- o Strengthen the oil refining sector to ensure greater supply flexibility.
- o Easing or reversing the trend to increased reliance on direct deal purchases from producing countries. [redacted]

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US options for enhancing Japanese energy security are limited. The export of Alaskan oil to Japan--which could reduce dependence on Middle East oil by over 10 percent and lessen Arab leverage on Japan--is presently viewed with little enthusiasm in Japan. According to Japanese statements, Tokyo has been concerned that such oil shipments could be diverted to US domestic use in the event of a global supply disruption. Natural gas from the North Slope could obviate the need for Soviet gas and reduce dependence on Indonesian supplies, but Tokyo has already contracted for all the gas it will need until 1990. Beyond 1990, additional gas requirements will likely be insufficient to support economic construction of the proposed Alaskan gas pipeline. As for coal, prospects for increased sales look bleak. Indeed, Japanese coal requirements in 1990 will probably fall short of government projections by over 600,000 b/doe, and purchases of US coal could well decline from present levels because of the high cost of US coal and stiff competition from other suppliers. [redacted]

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This memorandum was prepared by [redacted] Energy Issues Branch, Office of Global Issues. The information contained herein is updated to 24 March 1983. Comments may be directed to [redacted] Chief, Energy Issues Branch, on [redacted]

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Japanese Energy Security: Prospects and ImplicationsEnergy in Japan

Paralleling dramatic economic growth, Japanese energy consumption rose sharply during the 1960s and early 1970s--jumping from 1.9 million barrels per day oil equivalent (b/doe) in 1960 to nearly 7.1 million b/doe in 1973. Cheap imported oil met most of Japan's burgeoning energy needs, and by 1973 dependence on imported oil stood at 77 percent of total energy use. Rapid growth in energy and oil demand ended abruptly following the 1973 oil crisis. Through 1982, total energy consumption has increased by less than 300,000 b/doe and oil use had declined by over 900,000 b/doe. [REDACTED]

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Sluggish growth in energy demand and the falloff in oil use can be traced to slower economic growth and sharply higher oil prices. Annual economic growth rose an average of 3.4 percent between 1973 and 1982--approximately one-third the rate of the 1960-72 period. On the price front, imported crude oil prices increased more than 10 fold since 1973 (Table 1)--spurring major improvements in energy efficiency. The energy/GNP ratio has fallen over 23 percent since 1973 and is the lowest of any major industrialized country. The ratio of oil to GNP has fallen even faster (Table 2). Contributing to these declines has been a structural shift in the economy away from heavy, energy intensive industries, such as steel, to processing and assembling industries with low energy inputs, such as electronics. [REDACTED]

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Interfuel substitution has further reduced oil demand:

- o increased use of natural gas, coal and nuclear power in electricity generation has slashed annual oil requirements by nearly 350,000 b/doe since 1973.
- o conversion to coal in the cement industry following the 1979 oil price hikes has cut annual oil use by over 130,000 b/d.
- o in the steel industry, substitution of coal for oil in blast furnaces has reduced annual oil consumption by about 110,000 b/d since 1973. [REDACTED]

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Still, Japan faces a serious energy security problem. Poor in domestic resources, Japan--the Free World's second largest economy--depends upon imported energy for over 80 percent of its energy needs. Imported oil is the dominant fuel in all sectors of the economy and accounts for over 60 percent of the country's total energy consumption. Nearly two-thirds of Japan's oil requirements, moreover, come from the politically unstable Persian Gulf region. [REDACTED]

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Japanese Energy Policy: Looking to the 1990s^a

Cornerstones of current Japanese energy policy are: securing a stable oil supply, reducing dependence upon imported oil through the development and introduction of alternative energy sources, and continuing energy conservation efforts. []

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Oil Supply. Despite these efforts the Japanese economy remains highly vulnerable to supply disruptions as far as we can determine. Tokyo recognizes that this vulnerability will not change much in the future. With security of supply in mind the Japanese government has worked hard to keep smooth relations with oil exporting countries. The government itself has worked out government-to-government oil deals (for instance with Mexico); energy and related investment projects in OPEC countries (such as large petrochemical plants in Saudi Arabia); and sponsored oil exploration projects in Communist countries (China and the Soviet Union) and in OECD countries (Canada). Short-term components of oil supply security are private and government oil stockpiles. Under law, privately owned stockpiles must equal 90 days supply. The government-owned oil stockpiling program eventually envisions maintaining 315 million barrels of crude oil--a 66 percent increase over the previous plan. At the end of September 1982, both government and private stocks stood at 436 million barrels--roughly 120 days supply--but government stocks, at only 66 million barrels, were far short of planned levels. []

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Oil Alternatives. Through increased use of liquefied natural gas (LNG), coal, nuclear power, and unconventional energy sources, Japan plans to lower its dependence on imported oil to 49 percent of total energy use in 1990 and only 38 percent in the year 2000. Indeed, non-oil energy sources are projected to meet nearly all of Japan's future energy needs, with oil requirements through the end of the century forecast at about the 1980 level. To ensure stable supplies of LNG and coal, Japan is seeking to diversify its sources of supply; Japan has already signed long-term contracts for LNG supplies from six countries and has equity interest in coal development projects in several countries. []

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Energy Conservation. With only limited ability to expand domestic energy production, energy conservation occupies an important role in Japan's energy program. The government currently offers low-interest loans, special depreciation allowances, and tax deductions for energy saving equipment. By 1990, Tokyo estimates that conservation efforts will reduce the amount of energy required to produce a unit of GNP by nearly 16 percent compared with 1980, thus saving an estimated 1.9 million b/doe in 1990 alone. []

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Changing Outlook

Sharply lowered prospects for economic growth, together with structural changes in the economy, have transformed the outlook for Japanese energy

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demand. In the past year alone, Japanese government and private-sector forecasts of 1990 energy needs have been trimmed by about 10 to 20 percent

[] The recent record on conservation together with a slower economic growth performance in the years ahead account for these more moderate demand projections. Another reason they point to is the maturing of the Japanese economy and its transformation into a high-technology service economy will further restrain energy demand. According to the Japanese Economic Council, the share of gross domestic product accounted for by the service sector will rise from 33 percent in 1980 to nearly 50 percent by the year 2000. []

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Demand Projections. The most recent Japanese government forecast points to 1990 energy needs of 10.7 million b/doe. We believe this government projection will prove too high because it assumes a 5 percent annual economic growth rate. Indeed, according to the International Energy Agency, the Japanese Economic Advisory Council is revising its mid-term economic forecasts which Japanese observers suggest is likely to show 3.5-4 percent per annum economic growth. Recent Japanese private-sector projections already contain more realistic growth assumptions; these 1990 projections, consequently, are much lower than the available government forecast []:

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- o The Petroleum Association of Japan and the Bank of Tokyo project 1990 requirements at around 9 million b/doe.
- o The Institute of Energy Economics has become bearish on energy demand; in December it dropped its base 1990 forecast to 8.3 million b/doe.

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Based on the most recent Japanese private-sector forecasts and assuming an annual economic growth rate of about 3 percent, we believe Japanese energy requirements will reach 8 to 8.5 million b/doe in 1990 compared with about 7.3 million b/doe last year. By the year 2000, energy demand is likely to approximate 8.8-9.3 million b/doe--assuming a roughly 3 percent annual GNP growth rate during the 1990s and continued improvements in energy conservation

[] Although real economic growth may prove higher than what we have assumed for the 1990s, it would not necessarily result in corresponding gains in energy consumption since much of Japan's future economic expansion will occur in high-tech and service industries rather than in energy intensive industries. []

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Demand Close Up

Oil. Despite prospects for slow growth in energy consumption, Japan will remain heavily dependent upon oil over the next two decades. Based on our assessment of the development of non-oil energy sources, we believe oil consumption will approximate 4.5 million b/doe in 1990 and around 4.3 million b/doe in the year 2000. As a result, imported oil will account for nearly 55 percent of Japan's energy requirements in 1990 and about for just under 50 percent by the end of the century. []

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Natural Gas. Demand for natural gas is likely to grow more rapidly than the demand for any other major fuel during the 1980s; Japanese efforts to reduce oil use and the clean burning properties of gas have made natural gas a desired fuel. Gas requirements, however, will be substantially less than the Japanese were expecting when they initiated many of their gas supply projects in the mid-1970s. We believe Japan's gas needs will rise from current levels of about 500,000 b/doe to approximately 950,000 b/doe in 1990. This forecast, while in line with Japanese private-sector forecasts, is roughly 250,000 b/doe below the official Japanese government projection.

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gas requirements beyond 1990 are likely increase by only about 100,000 to 200,000 b/doe--far below government growth projections.

Lower gas demand estimates can be traced to price factors and strict contract conditions. The price of imported natural gas (LNG) is tied to crude oil prices in current contracts. Consequently, the price of heavy fuel oil--a lower quality by-product of crude oil and a major fuel in electric utilities and industry--is cheaper than LNG. LNG contracts, moreover, contain inflexible "take or pay" clauses. As a result, little growth in gas use for electricity generation beyond 1990 and the projected increase in industrial gas requirements is minimal. Present contractual obligations will provide supplies for the rapid growth in gas demand during the 1980s.

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Coal. We believe coal requirements in 1990 will fall far short of government projections. Lower than expected growth in electricity demand has lessened the need for new power plants. Because of existing LNG commitments and nuclear power plants under construction or site approved, we believe the bulk of the reduction in new power plant construction will fall on coal.

over 6 GW of coal-fired capacity representing about 160,000 b/doe have already been scrapped or delayed until the 1990s; additional delays or cancellations are possible. Declining oil prices and rising coal prices, moreover, have recently made the construction of new coal-fired plants uneconomic compared with continued operation of existing oil-fired facilities. In industry, the steel and cement industries have already converted their facilities from oil to coal, and we believe future growth in industrial coal use will be sluggish.

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Taking these factors into account--along with low growth in steel production, which currently accounts for about three-quarters of Japan's coal use--we place Japanese coal requirements in 1990 around 1.5 million b/doe--only about 150,000 b/doe above the 1981 level. Through increased use of coal for electricity generation, total coal requirements in the year 2000 could reach about 1.8-1.9 million b/doe, an amount that would still be sharply below current government projections of 2.7 million b/doe.

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Nuclear Power. Japan has the world's third largest nuclear power program--ranking behind only the United States and France. Future growth in nuclear power, however, is constrained by lower levels of projected electricity demand, public opposition, and siting difficulties. Of the 30 gigawatts (GW) of capacity planned to be added during the 1980s, we believe only 11 GW of capacity is likely to be in operation by 1990 given current construction lead-times. As a result, we place output from nuclear power in 1990 at around 800,000 b/doe--400,000 b/doe below government projections. By the year 2000, our analysis indicates nuclear power output probably will reach

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about 1.1-1.2 million b/doe--at least 1.3 million b/doe below official government projections. []

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New Energies.¹ [] unconventional energy sources--such as solar, wind, bio-mass and synthetic fuels--are unlikely to reduce Japan's dependence upon imported oil over the next two decades. Lower estimates stem from reductions in projections of future price levels which have lessened the perceived need to develop new energy sources. Moreover, [] there is still great uncertainty about the ability to develop the needed technology on a commercial scale. Sluggish oil and electricity consumption have also reduced government revenues from oil and electricity taxes--the primary sources of funds for alternative energy development. []

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Effect of an Oil Price Decline

Moderate oil price declines of 10 to 15 percent would have several benefits for Japan. A sharp, sustained oil price decline, however, could significantly worsen Japanese energy security by increasing Japanese requirements. A recent assessment by the Japanese Economic Planning Agency, and Japanese private-sector forecasts, for example, indicate a 10 percent decline in oil prices would boost energy requirements by about 300,000 b/d over a three year period. Given the 16 March OPEC pricing action--if it holds--and assuming the real price of crude remains at that level through the balance of the decade, energy demand in 1990 could approach 8.5 million b/doe--the high end of our projected range. Although the bulk additional demand would be met by oil, increased electricity generation could spur construction of new coal and nuclear power plants. Consequently, some existing oil-fired capacity could thus be retired or used only for peak-load demand. Additional government revenues from oil and electricity consumption taxes, moreover, would provide added funds for alternative energy development. []

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A larger decline in oil prices to \$20 to \$25 per barrel, however, would probably have a strong negative impact on coal and gas use, particularly in the longer term. [] real oil prices of around \$27 per barrel in 1985 and \$28 per barrel in 1990 are required to make coal a breakeven proposition in new power plants. Should the new lower oil prices be viewed as sustainable, construction schedules of new coal-fired power plants could well be scrapped or delayed indefinitely. On the gas front, several LNG projects could be postponed indefinitely as lower returns would make these large capital investment projects uneconomic. Moreover, because of long lead times needed to bring gas reserves to market, no new supplies would be available should energy prices recover by the early 1990s. []

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Japan: Sectoral Energy Use and Substitution Potential

Energy demand in all sectors of the Japanese economy will grow, but much less rapidly than government planners predict because of slower growth prospects and structural changes in the economy. Given present government policies and technical and economic constraints, only electric utilities are likely to significantly reduce their dependence on oil over the next two decades (Table 6). []

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Industrial

Industry is the largest energy consuming sector in Japan. Because of the continuing shift to less energy-intensive industries, future growth in energy demand will probably be sluggish. []

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Oil will likely remain the dominant industrial fuel over the next two decades due to the limited potential for fuel substitution. Increased coal use is constrained by environmental regulations, high capital costs, limited space for coal storage and preparation facilities, and problems regarding ash disposal and access to coal supplies. Capital costs, for example, are generally two to four times as much for coal than for oil or gas. The residue ash from burning coal creates immense disposal problems in a densely populated country like Japan. Although LNG use avoids many of the problems associated with coal, its high price relative to fuel oil and the inflexibility of "take or pay" contracts will likely impede its penetration in the industrial sector. Industrial electricity demand should trend upwards because of the increased production of computers, industrial robots, and machine tools. The high price of electricity, however, largely rules out supplanting oil through increased use of electricity. []

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Residential/Commercial

According to private-sector forecasts, energy demand is projected to grow at the fastest rate in the residential and commercial sectors. Growth of the service economy, higher living standards, additional buildings, and the increased use of cooling systems will all tend to boost total energy requirements. Electricity will likely be the fastest growing source of energy in this sector if forecasts of increased price competitiveness with other fuels prove correct and consumers continue to prefer clean energy sources. Natural gas and oil needs will also trend upwards. Widespread substitution of gas for oil, however, is constrained by the high prices of gas and the lack of a gas distribution infrastructure outside of Japan's major cities. []

Transport

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Energy requirements in the transport sector are also likely to rise, [] Despite improvements in engine fuel efficiency, gas and diesel fuels needs will trend upwards because of increased numbers of cars and trucks, more travel, and the increased use of air conditioners and automatic transmissions. []

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Electricity Generation

Due to rising electricity demand, the largest increase in Japanese energy requirements over the next two decades will occur in electric utilities. Electricity generation, however, will fall short of government projections by over around 20 percent according to Japanese private-sector forecasts. Oil consumption in this sector will decline sharply; Japanese private-sector forecasts place oil use at less than 20 percent of total utility energy needs in 1990 compared with around 40 percent at present. The high cost of generating electricity from oil compared to coal and nuclear power and the greater supply security of LNG account for the projected sharp decline in oil use (Table 7). [REDACTED]

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Changing Product Demand

Japan's oil requirements are rapidly shifting to lighter grade petroleum products (Table 8). Increased oil use in the residential, commercial, and transport sectors have raised the demand for light and medium-weight distillates, while fuel substitution efforts in industry and electric utilities have decreased the demand for heavy oils. By 1990, [REDACTED] heavy oils will account for only 28 percent of domestic oil demand compared with 38 percent in 1980. [REDACTED]

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Declining oil demand combined with rising oil prices in terms of yen, however, have caused heavy losses for many refiners. In fiscal 1981, Japanese oil refining and marketing firms posted the worst operating results in history, with losses of \$1.4 billion. Refineries are currently operating at only 50-55 percent of capacity. In order for the petroleum industry to provide stable oil supplies and the increasing quantities of lighter grade oil products that the economy will demand, a restructuring of the industry is essential. To this end, the government has called for the scaling down of refining capacity by 1 million b/d and is promoting the development of heavy oil cracking technologies in the industry. In addition, the Japan Development Bank currently offers loans at favorable rates for new investment projects. [REDACTED]

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Import Dependence

Because of limited domestic oil production potential, Japan will have to rely on imports for nearly all of its oil requirements through the year 2000. We believe the bulk of these imports will have to come from politically unstable Persian Gulf sources because the region contains 60 percent of the Free World's oil reserves. As a result, Japan will remain extremely vulnerable to oil supply disruptions over the next two decades. In recent years, moreover, Japan has increased direct purchases of crude oil from oil-producing countries at the expense of major oil companies (Table 9). As a result, the potential for producer leverage on Japan has increased while

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market buffers provided by oil company distribution systems have decreased.¹

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Although Japan will rely on imports for the bulk of its gas and coal needs, imports of coal and LNG pose far less of a security risk than oil. Based on current and proposed contracts, Japan is expected to be importing LNG from six to seven different sources in 1990. Major suppliers include Indonesia, Abu Dhabi, and Malaysia. Moreover, if all of the LNG projects now underway are completed as scheduled, we believe supplies to Japan will begin to exceed demand by 1985. In addition, Japan probably could withstand a major LNG supply disruption as long as alternative oil supplies can be obtained. Japanese electric utilities--the principal gas consumers--maintain a significant ability to switch to alternative fuels. Currently 62 percent of LNG-fired capacity can switch to alternative fuels, and by 1990 the utilities will have the capability to cut gas consumption by nearly 40 percent of total gas use.

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As for coal, the international market is currently demand constrained and export capability will likely exceed demand through at least the 1990s, according to market forecasts. Because of the abundance of suppliers and surplus export capacity, coal supplies would have to be disrupted simultaneously from several sources to cause severe problems. We believe Australia, the United States, and Canada--which provide around 90 percent of Japan's imported coal--will remain Japan's principal coal suppliers over the next two decades. As far ahead as we can see, either Australia or the United States could compensate for disruptions in supplies from other countries.

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Energy Security Implications²

The uncertain political climate in the Middle East and frequency of past oil supply disruptions underscore the potential for future disturbances. Petroleum systems consist of numerous production and export facilities highly vulnerable to damage from war or sabotage, and the Persian Gulf has the highest concentration of such facilities. A change in regime or political policies can also pose a threat to past oil flow patterns. Although the odds are against a major internal or external disruption in oil exports in any particular exporting nation or region, the probability of some sort of disruption occurring is quite high.

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The impact of a cutoff in Middle East oil supplies to Japan depends on the nature and extent of the disruption. We believe the effect of an Arab oil

¹ Contrary to popular political belief in Japan, the allocation of oil supplies by international oil companies following the 1973 oil crisis allowed Japan to suffer less than other countries: Japan experienced only a 3 percent shortfall below forecast supplies, compared to an 11 percent shortfall for the United States and 19 percent shortfall for Europe. In 1973, major oil companies supplied about 80 percent of Japan's oil.

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embargo solely against Japan would be negligible unless accompanied by sizable production cuts. Without production cutbacks, oil companies and trading firms can meet preexisting consumption patterns by reallocating supplies within their distribution networks. Of more concern, however, is the possible alteration of Japanese foreign policy in an attempt to secure a resumption of normal oil deliveries. Following the 1973 Arab oil embargo, for example, Japan issued a statement endorsing Palestinian rights and indicating that it might reconsider its policy toward Israel. []

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Japan and other oil importers would be hurt by deep, sustained production cuts (Table 10). Because of heavy Free World dependence on Persian Gulf oil--in particular Japanese and West European dependence--the United States would not be immune to the shocks of a major disruption in Middle East oil supply. Such disruptions would tend to lead to sharing of the burdens of the shortfall through adjustments in company distribution systems if the formal IEA oil sharing program were implemented. Moreover, competition among consuming nation governments for the remaining oil supplies could bid up world prices. Stock-building by Japan and other importers following the Iranian revolution, for example, helped exacerbate tight market conditions and drive up world oil prices. []

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Government Energy Security Policies

With limited domestic energy resources, Japan can only enhance its energy security by diversifying energy imports among fuels and sources of supply. Given numerous constraints, we believe there is little potential for Japan to significantly expand its use of non-oil energy sources beyond estimated levels. Increased use of LNG, for example, would require the reconsideration of pricing practices and "take or pay" clauses. Although there are moves to improve contract conditions because of the current buyer's market, [] do not expect much progress in the near future. LNG projects are highly capital intensive and, consequently, producers require a guaranteed market and considerable returns on investment before proceeding with construction. []

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We believe Japan's desire to minimize costs while enhancing energy security probably will preclude a significant increase in the use of other energy sources. A myriad of technical problems complicate coal use in industry, for example; any expansion in coal consumption rests largely with electric utilities. Because industry studies indicate that new coal-fired plants cannot economically replace existing oil-fired facilities government financial assistance would be required. In addition, we believe environmental regulations must be eased in some locations, and electricity rate compensation schemes could be required to ensure public acceptance. Based on an Institute of Gas Technology assessment, a large increase in synthetic fuels would require huge government subsidies because of the uneconomic nature of synfuels production and the immense capital requirements. As for nuclear power, public opposition and siting difficulties must be overcome. []

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Given Japan's present and projected heavy reliance on imported oil, we believe Japan probably should direct greater efforts toward minimizing the country's vulnerability to a cutoff in Middle East oil supplies. Such measures would include:

- o stepped-up efforts to diversify oil supplies away from Persian Gulf sources,
- o boosting government-owned oil stocks,
- o easing or reversing the trend to increased reliance on producer countries for oil supplies rather than on major oil companies, and
- o strengthen the refining sector to ensure sufficient production of lighter grade oil products. []

The US Option

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Some U.S. Government officials have indicated that Japanese energy security could be improved by allowing increased exports of U.S. domestic energy supplies to Japan, such as Alaskan oil, Alaskan LNG, and U.S. coal.

Alaskan Oil. Shipments of Alaskan oil to Japan have been discussed since the 1973 oil crisis. Annual Japanese imports of 500,000 b/doe of Alaskan oil could reduce Japan's dependence on Persian Gulf sources by about 10 percent and lessen Arab leverage on Japan. The export of Alaskan oil, however, is currently forbidden by US law and faces considerable domestic opposition in Congress and from US shipping interests. Japanese desire to acquire Alaskan oil, moreover, appears to be waning largely because of the present soft oil market. According to State Department reporting, although both the Japanese government and private industry would welcome the removal of the prohibition on Alaskan oil exports--primarily for long-term security considerations--Japanese liftings of Alaskan oil would be unlikely to exceed 100,000 b/d under present market conditions. Japanese companies, moreover, would be interested in Alaskan oil only if it could be supplied on a commercial basis and competitive terms, implying their opposition to any requirements for US tankers or a US emergency escape clause that would halt exports in an emergency situation. Given dampened Japanese enthusiasm in the current soft market, we believe it is unlikely that Japan would be willing to make significant new reciprocal concessions to obtain Alaskan oil. []

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Alaskan LNG. Japan has been importing about 25,000 b/doe of Alaskan LNG annually since 1969. Currently, there is a proposal for exporting Alaskan North Slope natural gas to Japan which envisions an 820 mile pipeline to carry North Slope gas from Southern Alaska for liquefaction and shipment to Japan.

[] the LNG would be competitive in the Japanese market in 1988--when

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deliveries of 125,000 b/doe could technically begin. Japan, however, has already contracted for all the gas it will need until 1990 [redacted] Beyond 1990, LNG requirements will likely stagnate or increase only slightly [redacted]

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[redacted] Although the expiration of some existing contracts will necessitate additional purchases beginning in 1993, the required volume will be insufficient to support the proposed capacity (370,000 b/doe) of the pipeline. [redacted]

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US Coal. Japan is the largest purchaser of US coal. We believe prospects for significantly increasing US coal sales to Japan are bleak. US coal is currently the most expensive coal purchased by Japan, and the Japanese are reluctant to sign long-term contracts with US suppliers until prices are more competitive with exports from Australia and South Africa. Moreover, recent private-sector forecasts place steam coal imports in 1990 at about 30 million tons--roughly half of 1980 projections. Consequently, major coal development projects in the western United States no longer appear necessary, [redacted]

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The Sakhalin Issue¹

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Part of Japanese efforts to increase energy security has been directed towards diversifying energy supplies. A point of contention between Japan and the United States has been Japanese participation in a joint venture to tap the offshore gas resources at Sakhalin Island. Although the venture has experienced poor planning and significant delays, we believe there are several reasons for the Japanese to continue the project:

- o The Japanese have already sunk considerable investment into the project--\$170 million in exploration alone--much of which would be lost if the project were cancelled. By the same token, Japan stands to gain a supply of gas at discount prices as well as lucrative Soviet business for its growing petroleum equipment industry if the project succeeds.
- o For Japan, knowing that it is the only market for Sakhalin natural gas, participation in the project is an important element to maintaining good relations with the USSR.
- o Dependent on Indonesia for over half of its LNG requirements, Japan is anxious to diversify its sources of supply, and nearby Sakhalin Island is a natural

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choice. It is closer to Japan than Alaska, Australia, or Malaysia and does not pose the same risk of political instability as do Abu Dhabi and Indonesia.

For these reasons Tokyo seems determined to proceed with the project even though Japan could obtain all the liquefied natural gas it will need from a variety of other suppliers. [REDACTED]

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Table 1

Japan: Energy Import Prices

(US \$ per million Btu)

	<u>Crude Oil</u>	<u>LNG</u>	<u>Coal</u>
1973	.57	.55	--
1974	1.89	1.32	1.41
1975	2.07	1.65	1.45
1976	2.20	1.80	1.38
1977	2.36	2.00	1.37
1978	2.43	2.33	1.50
1979	3.24	2.77	1.68
1980	5.70	5.03	2.15
1981	6.44	5.73	2.67
1982 ^b	6.08	5.64	2.56

^a Steam coal imports were restricted prior to 1974.

^b January-October.

Table 2

Japan: Measures of Efficiency

Index: 1973=100

	<u>Energy/GNP Ratio</u>	<u>Oil/GNP Ratio</u>
1973	100	100
1974	102.14	97.48
1975	96.08	90.89
1976	95.72	90.74
1977	91.37	88.56
1978	88.82	84.65
1979	87.76	80.92
1980	83.32	71.17
1981	79.07	64.73
1982	74.99	60.24

Table 3

Japan: Changing Projections of Energy Demand in 1990

(million b/doe)

Japanese Government (MITI)

	<u>1977</u>	<u>1979</u>	<u>1982</u>
Oil	8.4	6.5	5.3
Coal	2.3	2.2	2.1
Gas	1.2	1.2	1.2
Nuclear	1.6	1.4	1.2
Other	.9	1.4	.9
Total	14.4	12.7	10.7

Japanese Institute of Energy Economics

	<u>1978</u>	<u>1980</u>	<u>1982</u>
Oil	8.4	5.8	4.5
Coal	1.6	1.9	1.5
Gas	1.0	1.0	.9
Nuclear	1.0	.9	.9
Other	.4	.6	.5
Total	12.4	10.2	8.3

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	<u>1979</u>	<u>1981</u>	<u>1982</u>
Oil	7.9	5.2	5.1
Coal	1.5	2.1	2.1
Gas	1.2	1.2	1.0
Nuclear	1.5	1.1	1.0
Other	.8	.7	.7
Total	12.9	10.3	9.9

¹ Major US Oil Company.

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Japan: Energy Demand

(Thousand b/d oil equivalent)

	<u>1973</u>	<u>1980</u>	<u>1981</u>	<u>1990</u>	<u>2000</u>
Total Energy Use	7,016	7,552	7,434	8,000-8,500	8,800-9,300
Total Imports	6,307	6,508	6,205		
Oil Consumption	5,421	5,000	4,742	4,450-4,550	4,300-4,400
Domestic Production	14	10	8	50	50
Imports, of which:	5,400	5,091	4,650	4,400-4,500	4,250-4,350
Persian Gulf	4,120	3,547	2,990	2,500-2,700	2,250-2,450
Other OPEC	950	765	799	850	850
Total OPEC ^a	5,070	4,312	3,789	3,350-3,550	3,100-3,300
Other ^b	330	779	861	950-1,050	1,100-1,200
Natural Gas Consumption	110	475	491	900-1,000	1,000-1,100
Domestic Production	50	41	55	50	50
Imports, of which:	60	434	436	850-950	950-1,050
Indonesia	-	219	224	385	385-535
Abu Dhabi	-	50	50	55	0-240
Brunei	35	143	134	130	1
Alaska	25	22	28	-	-
Malaysia	-	-	-	155	155
Australia	-	-	-	125-155	155
USSR	-	-	-	0-75	75
Canada	-	-	-	0-75	75
Qatar	-	-	-	0-75	75
Coal Consumption	1,099	1,239	1,362	1,500-1,600	1,800-1,900
Domestic Production	252	214	209	150-200	150-200
Imports, of which:	847	983	1,119	1,300-1,450	1,600-1,750
Australia	371	426	502	600-700	700-800
United States	246	290	347	275-325	350-400
Canada	155	162	156	200-250	250-300
Other	75	105	114	175-225	250-300
Hydro & Other	340	447	433	450-550	600-700
Nuclear Power	46	391	406	700-800	1,100-1,200

^a Includes OPEC members.^b Including unknown.

Table 6

Japan: Sectoral Energy Demand^{a,b}

(thousand b/doe and percent)

	<u>1980</u>	<u>1990</u>	<u>2000</u>
Industry	2,736	2,725	2,830
Oil (percent)	49	44	41
Gas	2	3	3
Coal	30	32	32
Electricity	19	21	24
Residential/Commercial	1,056	1,340	1,570
Oil (percent)	53	48	43
Gas	15	14	13
Electricity	29	33	35
Other	3	5	9
Transport	1,114	1,295	1,335
Oil (percent)	98	97	96
Other	2	3	4
Electricity Generation	2,346	2,695	3,285
Oil (percent)	44	22	11
Gas	18	25	22
Coal	5	11	18
Nuclear power	16	28	36
Hydroelectric/geothermal	17	14	13

^a Fiscal year.^b Based on estimate by the Japanese Institute of Energy Economics.

Table 7

Japan: Electricity Generation Costs
(US Cents/KWH)

Nuclear Power	4.4
Coal	5.6
Oil and LNG	7.0-7.4

Source: Japan's Atomic Energy White Paper for 1982.

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Table 8

Domestic Oil Demand (Pie Chart)
percent

	<u>1973^a</u>	<u>1980^a</u>	<u>1990^a</u>
Light	26	28	31
Middle	26	34	40
Heavy	48	38	28

^a Fiscal year.

Categories include--light: gasoline, naptha;
middle: jet fuel oil, kerosine, gas oil heavy
oil A;
heavy: B and C heavy oils.

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Table 9

Japan: Crude Oil Purchases
(percent)

	<u>1977</u>	<u>1982</u>
Major Oil Companies	68	44
Oil-Producing Countries	19	44
Japanese Producers	8	9
Independents	5	3

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Table 10

Japan: Key Economic Variables
(percent)

	<u>Average GNP Growth Rate</u>	<u>Average Inflation Rate</u>	
		<u>Producers</u>	<u>Consumers</u>
1970--73	9.1	4.4	7.6
1974 ¹ -75	.5	13.7	17.4
1976--79	5.0	3.0	6.3
1980 ² -81	3.5	7.7	6.3

¹ Crude oil prices increased 290 percent following the 1973 oil embargo.

² Crude oil prices increased 170 percent following the Iranian revolution.

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